

## CLAIMS

1. A method for selectively absorbing oxygen from a gaseous mixture, preferably ambient air, into a liquid medium and subsequently releasing the oxygen to provide it in a concentrated form as a reaction partner for combustion or oxidation reactions, wherein at least one ionic compound being liquid at the respective process temperature is used as the medium, characterized in that at least one ionic liquid having a high reversible and – with regard to other gases, especially nitrogen – selective oxygen-uptake capacity is used as the medium.
2. The method of claim 1, characterized in that the anion and/or cation of the at least one ionic liquid includes a functional group with highly selective affinity to oxygen.
3. The method of any of the claims 1 or 2, characterized in that the medium comprises a high fraction of perfluorinated residues.
4. The method of any of the claims 1 to 3, characterized in that gas exchange for absorbing oxygen is achieved by directly blowing finely divided air into the medium.
5. The method of any of the claims 1 to 3, characterized in that gas exchange for absorbing oxygen is achieved by means of trickle-bed contactors.
6. The method of any of the claims 1 to 3, characterized in that gas exchange for absorbing oxygen is achieved by means of membrane contactors.
7. The method of any of the preceding claims, characterized in that the method serves for operating a combustion system for the combustion of fuels with oxygen in a combustion mixture and that the oxygen absorbed in the medium is released by being blown out by means of the combustion exhaust gases formed during the com-

bustion, constituting the combustion mixture together with these exhaust gases and the fuels.

8. The method of any of the preceding claims, characterized in that the absorbed oxygen is released by exposure to microwaves.

9. The method of any of the preceding claims, characterized in that the absorbed oxygen is released by catalytic degassing.

10. The method of any of the preceding claims, characterized in that the absorbed oxygen is released by temperature increase.

11. The method of any of the preceding claims, characterized in that the absorbed oxygen is released by pressure decrease.